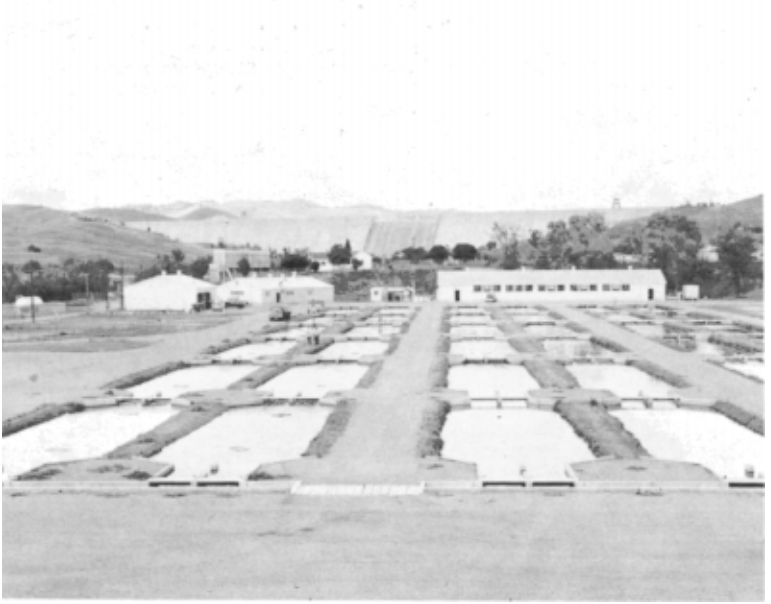

*A* view *of San Joaquin Fish Hatchery, showing Friant Dam in the background. In* the *foreground are the series of raceway ponds for rearing catchable-sized trout. Beyond these are the garage and food preparation and hatchery buildings.*

## TROUT MANAGEMENT

What is trout management and why is it necessary?

Management has come to mean almost everything done to protect trout and improve conditions for them. Seasons and bag limits are part of management, as are the investigations to determine the need for them. So are the rearing and stocking of hatchery trout and habitat improvement.

In a rapidly developing state like California it becomes progressively more difficult to maintain good trout fishing. Statistics show that in 1956 twice as many trout were caught as in 1936, but many more anglers had to share the crop. In 1936, some 149,000 anglers caught trout in California; in 1956 there were 640,000 successful anglers. In 1936, half of the trout anglers caught 50 trout while in 1956 half of the trout anglers caught 21 trout. In 1964 there were 931,000 successful trout anglers in California. Over 1,000,000 anglers spent about 9,000,000 days fishing for trout in 1968.

While angling pressure has been increasing, trout stream habitat has been destroyed or downgraded by the power and irrigation dams, increased logging, overgrazing, and stream pollution that go with an expanding economy. This, of course, has decreased the production of wild fish.

Stocking is the most popular form of trout management and the best known, but the high cost of hatchery fish makes it important to stock them where they will do the most good.

Research to find ways to increase the return of hatchery fish to the angler has been going on for a long time in many parts of the world. It has been shown that stocking fingerling trout in streams is poor business. Returns to the angler are often on the order of two percent of the fish stocked, or less. And the fish caught are usually small. Consequently, the department has embarked on a program of growing trout to catchable size in hatcheries before planting them in heavily-fished roadside waters.

In the case of fingerling steelhead planted in streams, returns to the angler are even lower. However, if the young steelhead are kept in the hatchery, and thus protected from natural hazards until they are about six inches long before they are stocked, returns are much greater.

In lakes the picture is quite different. When fingerling trout are stocked in suitable lakes without many predators, returns may be quite high, because more of the fish survive than in streams, where conditions are more rigorous.

Many California lakes do not have spawning tributaries suitable for trout. Periodic fingerling stocking maintains the trout populations in them at a reasonable cost. This has led to a sizable program of airplane stocking of small fish in about 1,000 remote mountain lakes in California.

Many high mountain lakes with springs or small tributaries can produce large natural crops of eastern brook tout and therefore do not require stocking. In fact, overpopulation and stunting of eastern brooks under such conditions is not uncommon when fishing pressure is light.

California is still a long way from getting the most out of the trout stocked, in terms of recreation and recapture of the stocked fish. More research is the only answer.

Department biologists are exploring the results obtained by stocking different species and strains of fingerlings in various types of lakes. The role of brown trout under California conditions is being investigated because of increased interest in this fish in recent years.

Habitat improvement is another tool of trout management with great possibilities. The removal of rough fish with chemicals can often put a lake with virtually no fishing back into good trout production at a reasonable cost.

Flow maintenance dams, which keep mountain streams running when they would otherwise dry up in late summer, are also good management in California under suitable conditions, although the number of dam sites at which benefits are in line with costs is limited.

Chemical control of weeds that smother some trout lakes, improvement of spawning areas, especially by removal of barriers that block spawning runs, and control of erosion in badly overgrazed meadows all have limited application under California conditions.

*Reyes Creek, Ventura County. The low dam in the foreground is an example of stream improvement work. Trout pools have been formed above the dam and directly beneath the waterfall.*

Small stream improvement devices, which create pools or provide shelter, are not usually needed in California, since most trout streams in their natural state possess a good balance of pools and riffles. Moreover, such devices are subject to destruction by the periodic winter floods that occur in most streams in the State.

Except for rough fish control, the cost of habitat improvement is apt to be high in relation to the benefits. It often costs a good deal more to put another trout into the creel by habitat improvement than by stocking catchable-sized trout.

Under present conditions it is even more urgent to protect the existing trout habitat than to improve it. New power projects are developing throughout the mountain areas. For every such project, it is the responsibility of the Department of Fish and Game to gather and present to the Federal Power Commission or other controlling agencies information demonstrating the need for adequate releases of water for fish.

Small diversions from streams for farming or domestic use can eventually add up to produce a dry stream bed. Improper logging practices are devastating many miles of stream each year. The scene in the illustration is a common one along the north coast.

Ruinous pollution from mining operations is taking place in some areas.

All these developments require strenuous effort just to maintain existing trout habitat. This is a most important management activity, for each loss of habitat reduces the wild trout crop.

*This dam, constructed at the outlet of Upper Emigrant Lake, Tuolumne County, has increased the lake's capacity for trout and helps maintain the flow of water in the stream below.*

*This once fine steelhead spawning stream was loaded with slash from logging operations that rendered useless its spawning gravels.*

The greatest hope for increasing the present supply of trout lies in even more intensive management of existing fisheries. This will involve protection of the existing habitat, carefully controlled stocking of hatchery fish of the best sizes and varieties in each lake and stream, introduction of forage organisms, and habitat improvement when practical. Such management is like intensive farming, wherein every parcel of land is managed to its highest productivity.

Each type of lake and stream presents a different management problem, which can be solved only through research. Unfortunately, fisheries science in this field is many years behind agriculture with its similar problems. Agriculture has developed new and better strains of plants and animals, and has discovered how to get the most from each under different soil and climatic conditions. Fisheries science must do the same.